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THE USE OF THE FEDERAL INCOME TAX SYSTEM TO COMBAT AIR AND WATER POLLUTION: A CASE STUDY IN TAX EXPENDITURES

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I. INTRODUCTION

During the past few years there has been a proliferation in the number of proposed methods of providing financial assistance for combatting air and water pollution. Included are proposals for direct federal grants,¹ federal low-interest loans,² effluent fees,³ and special financing techniques for municipal treatment facilities⁴ and river basin authorities.⁵ There have also been many suggestions that the federal income tax system be utilized to aid antipollution efforts. These proposals usually take the form of allowing a special deduction⁶ or a tax credit⁷ for investment in qualified pollution control equipment. Since World War II more than 80 tax bills have been introduced in Congress to encourage investment in pollution control equipment.⁸

Tax measures specifically designed for antipollution efforts had their genesis in the federal income tax laws in 1966 with the suspension of the seven percent investment credit. At that time an exception was made continuing the credit during the suspension period for pollution control facilities.⁹ In 1968, bonds for pollution control facilities were granted an exception to the repeal of the tax-exempt status of industrial

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¹ See, e.g., ABT Associates, Inc., *Incentives to Industry for Water Pollution Control: Policy Considerations 46-47* (1967) [prepared for the Federal Water Pollution Control Administration United States Department of the Interior, in fulfillment of § 18 of the Federal Water Pollution Control Act, 33 U.S.C. § 466n (Supp. V, 1970)].

² See, e.g., ABT Associates, Inc., *supra* note 1, at 48-50.

³ *Id.* at 97-100.

⁴ See, e.g., Roberts, *River Basin Authorities: A National Solution to Water Pollution*, 83 Harv. L. Rev. 1527, 1538-540 (1970).

⁵ *Id.* at 1544-556.

⁶ See, e.g., 116 Cong. Rec. S6380 (daily ed. April 30, 1970) (proposal of Senator Byrd allowing an individual taxpayer to deduct from gross income the cost of eligible pollution control equipment).

⁷ See, e.g., ABT Associates, Inc., *supra* note 1, at 41.

⁸ *Id.* For an earlier compilation of bills introduced in Congress to provide tax incentives for the construction of air and water pollution control facilities, see 112 Cong. Rec. 7933-936 (1966).

⁹ Act of Nov. 8, 1966, Pub. L. No. 89-800, § 1(a), 80 Stat. 1508, 1511-512, codified in Int. Rev. Code of 1954, § 48(h)(12) (repealed).

development bonds.¹⁰ Most recently, the Tax Reform Act of 1969 included a provision allowing a taxpayer to amortize over a five-year period a portion of the cost of his investment in qualified pollution control facilities.¹¹

This article will examine the considerations involved in using the federal income tax system to encourage efforts to control environmental pollution through an analysis of the five-year rapid amortization provision of the Tax Reform Act of 1969, Section 169 of the Internal Revenue Code. Financial assistance through the tax mechanism is an alternative to other forms of direct federal aid. As such, the new tax provision must be compared to these alternatives—direct grants, low cost loans, and the like—as to equity, efficiency, and effectiveness.

II. LEGISLATIVE HISTORY OF SECTION 169

When President Nixon recommended repeal of the seven percent investment tax credit in April, 1969,¹² testimony by private industry representatives before the House Ways and Means Committee suggested that an exception be made for pollution abatement facilities.¹³ It was argued that if an exception were not carved out for pollution control facilities, many industries would find it extremely difficult to comply with federal, state and local regulations governing air and water pollution.¹⁴ Industry representatives pointed out that pollution control facilities do not increase earnings, improve competitive position, expand production or cut costs.¹⁵ They further asserted that investment in pollution control facilities serves only a social purpose and that the public should thus share part of the cost of the investment.¹⁶ Some witnesses even suggested that the investment tax credit should be increased above the seven percent rate.¹⁷

The Treasury¹⁸ and the Department of Health, Education and

¹⁰ Int. Rev. Code of 1954, § 103(c)(4)(F).

¹¹ Int. Rev. Code of 1954, § 169.

¹² Message from the President of the United States Regarding Tax Reform, H.R. Doc. No. 103, 91st Cong., 1st Sess. (1969).

¹³ See, e.g., Hearings on the President's Proposal to Repeal Investment Tax Credit and to Extend Surcharge and Certain Excise Tax Rates Before the House Ways and Means Comm., 91st Cong., 1st Sess. 158 (statement of Edwin A. Locke, Jr., President, American Paper Institute); id. at 167 (statement of William Verity, President and Chief Executive Officer, Armco Steel Corp.); id. at 193 (statement of Edmund F. Martin, Chairman and Chief Executive Officer, Bethlehem Steel Corp.).

¹⁴ Id. at 449 (statement of Representative John M. Slack); id. at 386 (statement of Joseph E. Moody, President, National Coal Policy Conference, Inc.); id. at 366 (statement of J.B. Gutenkunst, President, Milwaukee Malleable and Grey Iron Works).

¹⁵ Id. at 193 (statement of Edmund F. Martin).

¹⁶ Id. at 202 (statement of F. A. Fielded, CF&I Steel Corp.).

¹⁷ Id. at 204 (statement of Waldo B. Lyden, Chairman, Tax Committee, Can Manufacturers Institute, Inc.).

¹⁸ Id. at 24-25 (supplementary statement of Hon. David M. Kennedy, Secretary of the Treasury).

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Welfare (HEW)¹⁹ opposed any exception to preserve the investment credit for antipollution devices. The Treasury feared that opening the door to an exception for pollution abatement facilities would invite other exceptions, and thus erode the effectiveness of repeal of the investment credit as an anti-inflationary measure.

Former Secretary Finch of HEW, in a letter to the House Ways and Means Committee, argued that the tax credit would not be an effective stimulus to pollution abatement.²⁰ From the standpoint of private industry, since the necessary equipment yields little or no return, alternative uses of funds would be economically more attractive even with the seven percent tax credit. Hence, any "incentive" effect of a tax preference was doubtful. Further, Secretary Finch argued, the prime incentive for industry to engage in pollution abatement efforts arises from state and local regulatory requirements. Thus the tax credit would constitute a windfall rewarding businesses for doing what they would have to do in any event. Under this analysis, Secretary Finch concluded that the proposal to provide an investment credit for pollution control facilities simply amounted to cost-sharing by the federal government. As such, the tax cost-sharing approach had to be evaluated like any other proposed federal aid to private business from the standpoint of need, efficiency and effectiveness.

Secretary Finch pointed out that the cost to industry of effective pollution control is quite small. A 1967 report by an interagency Working Committee on Economic Incentives entitled "Cost Sharing With Industry?" concluded that the annual cost of effective air and water pollution abatement would average less than one-third of one percent of value-added by all manufacturing and electric power industries.²¹ This relatively small cost did not appear to warrant federal cost-sharing.

The federal subsidy through the investment credit was also considered an inefficient and, in the long run, possibly counter-productive approach to pollution abatement. The investment credit could only be available for investment in end-of-the-line hardware. Thus there would be marked incentive for businesses to use hardware as a solution to every pollution problem, precluding experimentation with changes in fuel, processing techniques, or changes in raw materials utilization, none of which could qualify for the federal tax cost-sharing funds. Technically, these latter methods appear to many antipollution experts

¹⁹ Id. at 129-30 (statement of Hon. Robert H. Finch, Secretary of HEW).

²⁰ Id.

²¹ Cost Sharing With Industry? Summary Report of the Working Committee on Economic Incentives (Revised) 3 (Nov. 20, 1967). The Working Committee was one of several committees under the aegis of the Federal Coordinating Committee on the Economic Impact of Pollution Abatement.

to offer sounder long-range approaches to pollution abatement, and Secretary Finch therefore argued that the tax credit would subsidize the more inefficient and ineffective techniques.

Despite Treasury and HEW opposition to an investment credit, and with no substantive supporting study, the House Ways and Means Committee voted a special five-year rapid amortization provision for certified pollution control facilities as a substitute for the seven percent investment credit.²² Under this provision, a taxpayer could deduct the total cost of pollution abatement equipment in five years even though normal tax depreciation rules would establish a longer useful life for the property. Viewed as a tax measure, the Treasury estimated that equipment with a 50 year useful life would have received a tax benefit from the new rapid write-off provision equal to a 20 percent investment credit.²³ Viewed as an expenditure provision, the House, in effect, proposed to appropriate \$400 million annually to share costs for an effort that, from the evidence available, needed no subsidy, and for an approach which, in the view of the experts, would in the long run be ineffective and inefficient.

In hearings before the Senate Finance Committee on H.R. 12290, the Treasury acquiesced rather half-heartedly in the five-year rapid amortization provision for pollution control facilities, but suggested that the scope of the House provision be limited in several respects.²⁴ First, the Treasury recommended that the tax assistance not be made available to plants constructed in the future which presumably would install antipollution control facilities under local regulatory requirements. Second, in order to eliminate the bias in favor of property with a long useful life, the Treasury recommended that the rapid write-off be available only for the first 15 years of the life of any property. Finally, the Treasury concluded that the definition of a qualified pollution control facility should be tightened so that the tax preference would apply only to treatment facilities which are clearly identifiable as serving only antipollution purposes.

In later hearings on H.R. 13270 (The Tax Reform Act of 1969), The Treasury belatedly recanted its earlier position and raised serious doubts as to the necessity for and effectiveness of a tax incentive for pollution control:

²² Report of the Committee on Ways and Means to accompany H.R. 12290, H.R. Rep. No. 321, 91st Cong., 1st Sess. 2, 15-16 (1969); Report of the Committee on Ways and Means to accompany H.R. 13270, H.R. Rep. No. 413, 91st Cong., 1st Sess., pt. 1, 196-200 (1969).

²³ Hearings on H.R. 12290 Before the Senate Comm. on Finance, 91st Cong., 1st Sess. 62-63 (statement of Hon. David M. Kennedy).

²⁴ *Id.*

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The overwhelming incentive for industrial pollution control will continue to be governmental antipollution enforcement action, or the threat thereof. A tax relief provision in this setting is not an incentive so much as it is a type of cost sharing, or more accurately, an interest-free loan, to reduce the industrial cost of compliance with enforcement action.²⁵

The Treasury did, however, repeat its earlier testimony that, at a minimum, the provision should be amended to limit the write-off to the first 15 years of the life of the facility and to restrict the write-off to facilities installed in existing plants.²⁶

In the Senate hearings both on H.R. 12290 and H.R. 13270, industry representatives strongly endorsed the five-year amortization provision.²⁷ Some representatives proposed even more ambitious alternatives to the five-year write-off such as (1) allowing a taxpayer to use an investment tax credit in conjunction with the rapid amortization,²⁸ (2) giving the taxpayer the option of writing off the cost of the pollution control facilities in a period of less than five years,²⁹ (3) broadening the category of qualified facilities to include fuel desulphurization facilities,³⁰ land³¹ and smokestacks,³² and (4) eliminating the dual certification of state and federal agencies and vesting complete supervisory powers in the state agencies.³³

²⁵ Hearings on H.R. 13270 Before the Senate Committee on Finance, 91st Cong., 1st Sess., pt. 1, at 621 (1969) (statement of Hon. Edwin S. Cohen, Assistant Secretary of the Treasury for Tax Policy).

²⁶ *Id.* at 621-22.

²⁷ See, e.g., Hearings on H.R. 12290, *supra* note 23, at 350 (statement of W. P. Gullander, President of the National Association of Manufacturers).

²⁸ *Id.* at 484 (statement of Edmund F. Martin); *id.* at 490 (statement of the Board of Directors, Chamber of Commerce of the United States); Hearings on H.R. 13270, *supra* note 25, pt. 6, at 5223 (statement of Donald H. Gleason, National Association of Manufacturers).

²⁹ See, e.g., Hearings on H.R. 12290, *supra* note 23, at 459-60 (statement of John R. Greenlee, Chairman, Tax Policy Committee, Tax Council); *id.*, at 490 (statement of Board of Directors, Chamber of Commerce of the United States); Hearings on H.R. 13270, *supra* note 25, pt. 2, at 1247 (statement of Lester W. Brann, Jr., Exec. V.P., Ill. State Chamber of Commerce); *id.*, pt. 5, at 4723 (statement of George S. Koch, Council of State Chambers of Commerce); *id.*, pt. 6, at 5223 (statement of Donald H. Gleason).

³⁰ See, e.g., Hearings on H.R. 12290, *supra* note 23, at 468-71 (statement of Fuel Desulphurization, Inc.).

³¹ *Id.* at 490 (statement of Board of Directors, Chamber of Commerce of the United States).

³² *Id.* at 408-09, 411, 413-15 (testimony and statements of Herbert B. Cohn and Maynard E. Smith on behalf of Edison Electric Institute); *id.* at 520-21 (statement of John D. Hicks, Secretary and General Counsel, Duke Power Co.).

³³ *Id.* at 489-90 (statements of Don A. Goodall, General Manager, Legislative Action, Chamber of Commerce of the United States and the Board of Directors, Chamber of Commerce of the United States); *id.* at 527-28 (statement of John D. Cleary, Consolidated Edison Co. of N.Y.); Hearings on H.R. 13270, *supra* note 25, pt. 2,

III. TECHNICAL DESCRIPTION OF SECTION 169

The Senate Finance Committee voted to include a special five-year amortization provision in the Tax Reform Act of 1969,³⁴ and this version was adopted by the conference committee.³⁵ The deduction is limited to pollution control facilities added to plants which were in operation before January 1, 1969, and only for that proportion of the cost of the property attributable to the first 15 years of its normal useful life.³⁶ The special deduction is allowable only for a "certified pollution control facility," which generally is defined as depreciable property which is a separate identifiable treatment facility used to abate or control water or atmospheric pollution or contamination by removing, altering, disposing or storing pollutants, contaminants, wastes or heat, and which is appropriately certified. A building is not a pollution control facility unless it is exclusively a treatment facility, and a pollution control facility does not include any facility which serves any function other than pollution abatement. Facilities which only diffuse pollution, as distinct from abating it, do not qualify. Thus, a smokestack on a plant the height of which was increased to disperse pollutants over a broader area would not be a qualified pollution control facility. Also, section 169 does not provide tax assistance for the cost of fuel desulphurization facilities or other facilities that remove pollutants

at 1279-280 (statement of Tax Committee, Can Manufacturers Institute, Inc.); *id.*, pt. 6, at 5224 (statement of Donald H. Gleason).

³⁴ Report of the Senate Comm. on Finance to accompany H.R. 13270, S. Rep. No. 552, 91st Cong., 1st Sess. 248-52 (1969).

³⁵ Statement of the Managers on the Part of the House, Conference Rep. No. 91-782, 91st Cong., 1st Sess. 326 (1969).

³⁶ Where a property has a normal useful life of more than 15 years, the taxpayer, in effect, treats his facility as if it were two separate facilities. One facility (representing the portion of the total cost attributable to the first 15 years of useful life) is eligible for the 5-year amortization. The other facility (the remaining cost) receives regular depreciation based upon the entire normal useful life of the property which can be claimed concurrently with the rapid amortization deduction. If the property has a normal useful life of 15 years or less, the total cost of the property is eligible for the 5-year amortization.

The 60 month amortization period begins either with the month in which the facility was completed or acquired or with the next taxable year, whichever the taxpayer elects.

The amortization deduction for any month is in lieu of the regular depreciation deduction which is allowable for that month under §167 of the Int. Rev. Code of 1954. A taxpayer who elects the amortization deduction, however, is still eligible to receive the additional 20% first year depreciation allowance under §179 of the Code. However, no investment credit is available for that portion of any facility for which the 5-year amortization deduction has been elected.

The depreciation recapture rules applicable to personal property (§ 1245 of the Code) apply to the amortization deduction. As a result, if any facility is sold or otherwise disposed of, gain is taxable as ordinary income to the extent of the previous amortization deductions. The depreciation recapture rules applicable to real property (§ 1250 of the Code) do not apply to the amortization deduction even if the taxpayer's pollution control facility consists of real property which would ordinarily be subject to § 1250 recapture.

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from fuel, apparently because such expenditures cannot be separated from income-producing activities.

The special deduction is available only with respect to a pollution control facility which is certified by the appropriate state and federal authorities.³⁷ The state authority must certify to the federal authority that the facility has been constructed or acquired in conformity with the state program or requirements regarding the abatement or control of water or air pollution or contamination. Then the responsible federal agency must certify to the Secretary of the Treasury with respect to any pollution control facility that the facility (1) is in compliance with the applicable regulations of federal agencies, and (2) is in furtherance of the general policies of the United States for cooperation with the states in the prevention and abatement of water and air pollution under the Federal Water Pollution Control Act or the Clean Air Act, respectively. The federal certifying authority cannot certify any facility to the extent that it appears that the costs of the facility will be recovered over its actual useful life by reason of profits arising from the recovery of wastes or otherwise in the operation of the facility.³⁸

Rapid amortization is available only with respect to a facility, the construction of which was completed by the taxpayer after 1968, or which was acquired after 1968 if the original use commences with the taxpayer after that time,³⁹ and which is placed in service before January 1, 1975. This termination date reflects a congressional decision to review the effectiveness and efficiency of the new tax preference before it becomes too solidly embedded in the tax laws.

³⁷ In the case of water pollution, the state certifying authority means the state water pollution control agency as defined in § 13(a) of the Federal Water Pollution Control Act, 33 U.S.C. § 466j(a) (1964) and the federal certifying authority is the Secretary of the Interior. In the case of air pollution, the state authority is the air pollution control agency as defined in § 302(b) of the Air Quality Act, 42 U.S.C. § 1857h (b) (1964), and the federal authority is the Secretary of HEW. An interstate agency authorized to act in place of a state certifying authority is treated as the certifying authority of the state.

On June 5, 1970, Secretary Hickel of the Department of the Interior issued proposed regulations containing requirements and procedures for obtaining certifications from the Secretary of the Interior for purposes of § 169 of the Code. 18 C.F.R. pt. 602 (1970).

³⁸ The report on H.R. 13270 by the Section of Taxation of the American Bar Association recognizes a technical deficiency in the Act:

The term "profits" is not defined. Ordinarily, this would mean an excess of receipts over expenses including an allowance for the recovery of costs in the form of depreciation. Under this definition of "profits," costs would have to be recovered twice to prevent certification. Also, it is not clear whether some portion of costs could be certified if there were a partial recovery through "profits." In any case, certification depends upon a projection of "profits" which may not in fact be recognized.

Hearings on H.R. 13270, *supra* note 25, pt. 6, at 5205.

³⁹ Only that portion of the basis of property constructed by the taxpayer which is properly attributable to construction after 1968 is taken into account for purposes of the amortization deduction.

IV. TAX EXPENDITURES AND TAX EQUITY

Although the life of section 169 is of limited duration, it is still instructive to examine its effect upon the corporate income tax system.⁴⁰ Since the passage of the Payne-Aldrich Tariff of 1909,⁴¹ in which the federal government assessed its first income tax on corporations, there has been a continuing concern that the revenue-raising purpose of the tax has been beclouded by the use of the tax as a device for implementing other government policies.⁴² This concern has expressed itself in terms of closing "loopholes," broadening the tax base and the like.

More recently a new concept has emerged which has proved to be a highly useful tool in evaluating the impact of special tax rules from the standpoint of tax equity and fiscal efficiency. Former Assistant Secretary of the Treasury for Tax Policy Stanley S. Surrey has labeled these rules as "tax expenditures," defining them as those "special provisions of the federal income tax system which represent government expenditures made through that system to achieve various social and economic objectives."⁴³ Correlatively, a tax expenditure may be viewed as "an estimate of the amount of revenue that would be raised if the tax law conformed to an agreed model."⁴⁴ Tax expenditures may take the form of deductions, credits, exclusions, exemptions, deferrals or preferential rates. While most of the tax expenditure discussion has centered on the individual income tax,⁴⁵ the concept has equal validity in analyzing the provisions of the federal corporate income tax.

Put in its simplest terms, the tax expenditure concept views a deduction, for example, as an imputed collection of the tax that would have been due had the deduction not been available, with a simultaneous appropriation of funds by the federal government to the taxpayer in the amount of the tax saving. The tax expenditure can take the form of a direct grant, a low-cost or interest-free loan, or interest subsidy, or any of a variety of other direct governmental programs.

Tax expenditures, however, deviate from principles of tax fairness

⁴⁰ Although § 169 theoretically applies to individuals and corporations, it will be utilized primarily at the corporate level. It appears doubtful that the well-known leasing transaction will lend itself readily to pollution control facilities. Accordingly, this article will not discuss the effect of § 169 on the individual income tax.

⁴¹ Act of Aug. 5, 1909, ch. 6, 36 Stat. 11.

⁴² See generally Blum, *Federal Tax Reform, Twenty Questions*, 41 *Taxes* 672 (1963); Stone, *Tax Incentives as a Solution to Urban Problems*, 10 *Wm. & Mary L. Rev.* 647 (1969).

⁴³ Surrey, *Tax Incentives as a Device for Implementing Government Policy: A Comparison With Direct Government Expenditures*, 83 *Harv. L. Rev.* 705-06 (1970). See also McDaniel, *Alternatives to Utilization of the Federal Income Tax System to Meet Social Problems*, 11 *B.C. Ind. & Com. L. Rev.* 867, 868-75 (1970).

⁴⁴ Kurtz, *Tax Incentives: Their Use and Misuse*, *U. So. Cal. Tax Inst.* 1 (1968).

⁴⁵ Bittker, *Accounting for Federal "Tax Subsidies" in the National Budget*, 22 *Nat. Tax J.* 244 (1969); Surrey and Hellmuth, *The Tax Expenditure Budget—Response to Professor Bittker*, 22 *Nat. Tax J.* 528 (1969).

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by exempting income from tax, by permitting excessive or accelerated deductions, or by providing preferential rates of tax. In the corporate area, two businesses with the same net business income will pay differing amounts of tax if one can qualify for the special benefits accorded through the tax expenditure. It is therefore useful to analyze the new rapid amortization provision for pollution control facilities as a tax expenditure, and then to project it as a direct expenditure system to evaluate its efficiency and effectiveness. Only if such an analysis is undertaken can one determine if the price paid in the loss of tax equity is worth the benefits derived from effecting the federal expenditure through the tax system.

There are several threshold factors which must be taken into account in determining whether the corporate income tax system should be used to accomplish the major social objective of solving the air and water pollution problem. First, a corporate income tax is successful only to the extent that it raises revenue for the government. The revenue raised through the corporate income tax approximates 25 percent of federal revenues.⁴⁶ The new rapid write-off for pollution control facilities will reduce this take by some \$120 million annually when fully effective.⁴⁷

Second, although the corporate tax system does not rely on a progressive rate structure, tax expenditures in the corporate income tax system produce inequities just as in the individual income tax system. In order to insure fairness in a corporate income tax system, it is necessary that the system impose the same tax liability on corporations with equal amounts of business net income, a concept that has a relatively well-defined meaning in accounting and economic terms. The new rapid amortization provision results in tax inequity since two firms with the same business net income will pay different corporate income taxes only because of the ability of one firm to use the rapid write-off. Even though society benefits from increased antipollution efforts by corporations, it is not necessary that tax favoritism accompany the social reform. For example, special tax benefits generally are not provided for those businesses which must take extraordinary steps to insure safe working conditions for employees. There is a further inequity between firms having the same pollution problems but utilizing different methods for combatting the pollution. As noted above, section 169 puts a premium on capital investment in end-of-the-line pollution abatement facilities while offering no tax benefits for other pollution control activities which are often less expensive and more efficient than

⁴⁶ B. Bittker & J. Eustice, *Federal Income Taxation of Corporations and Shareholders* 3 (2d ed. 1966).

⁴⁷ Revenue Estimates Relating to the House, Senate, and Conference Versions of H.R. 13270, Table 6 (1969).

the antipollution hardware which receives the special deduction.⁴⁸ Thus, like all tax expenditures, the rapid write-off provision creates differing tax results among similarly situated taxpayers on a basis wholly apart from proper rules of accounting for the cost of producing income.

There are also upside-down effects that result from the rapid write-off provision. Corporations with a loss get no benefit from the special deduction. Thus, the Penn Central Railroad presumably will not benefit from section 169, although it may well have a substantial need for financial assistance to meet antipollution requirements or responsibilities. Similarly, under the present rate structure, every corporation pays a normal tax of 22 percent of its taxable income and a surtax of 26 percent of its taxable income over \$25,000.⁴⁹ Thus, the special deduction for pollution abatement facilities for a corporation in the higher bracket is subsidized by the government to the extent of 48 percent of the cost, while an expense which qualifies as a deduction for a corporation in the lower bracket is subsidized only to the extent of 22 percent of the cost. In short, the corporation which presumably is in greater need of federal financial assistance gets the least help.

V. ALTERNATIVE METHODS OF VIEWING THE RAPID AMORTIZATION PROVISION

A. *As an Investment Credit*

It is helpful in analyzing the rapid amortization provision to restructure it to conform to other types of federal financial assistance, tax as well as nontax. Section 169 can be reconstructed as an investment credit by determining the present value of the net additional tax saving resulting from the rapid amortization rules above the saving realized from normally available depreciation methods. To arrive at this figure, the total net after tax "loss" (i.e., the increased taxes resulting from

⁴⁸ Assume that Corporation A has depreciable assets which are not pollution control facilities, and, after all deductions, has taxable income of \$500,000. Corporation B has an identical cost basis in depreciable assets, part of which are certified pollution control facilities. In the absence of the rapid amortization provision, Corporation B would have the same taxable income as Corporation A and pay the same federal income tax. Solely because of the special tax provision, Corporation B will now pay a lower tax for 5 years than Corporation A.

It may be questioned whether there is any tax inequity created between investment in antipollution equipment and fuel change techniques, since the costs of fuel are fully deductible. Hence, if Corporation A shifts to a higher cost fuel, its additional costs are deductible as incurred. The inequity noted, however, remains. Assume Corporations A and B each have 100 gross income, 10 annual depreciation charges, and 10 annual fuel costs. A must meet antipollution standards by changing to a higher cost fuel, so that annual fuel costs are now 15. B, however, can invest 75 in 15 year useful life property that will qualify under § 169. In the absence of § 169, A and B would have continued to pay the same tax (assuming straight-line depreciation is used by B). By virtue of § 169, B's taxes will be less for five years. See also note 75 infra.

⁴⁹ Int. Rev. Code of 1954, § 11.

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reduced depreciation deductions in the years following utilization of rapid amortization) per year during the sixth year to the last year of the property's normal useful life must be subtracted from the total net after-tax saving per year during years one through five. The net saving per year during years one through five is determined by subtracting the value of the deduction for each year under a regular depreciation method (double-declining balance, sum-of-the-year's digits, or straight line) from the value of the deduction for each year under the rapid write-off provision. The total net saving during years one through five is then calculated by discounting the net saving for each year at a rate of interest representing the corporation's opportunity investment cost. The net after-tax "loss" during the sixth year to the last year of the property's normal useful life is determined by calculating the value of the regular depreciation deduction foregone by the taxpayer who has opted for the five-year rapid write-off method. The total net after-tax "loss" is then derived by discounting the net "loss" for each year at the same rate of interest used to compute the total net savings during years one through five.

The equity issue is focused by comparing the tax credit thus computed and allowed for a 48 percent bracket corporation with investment in qualifying pollution control facilities, a 48 percent bracket corporation which takes antipollution steps that do not qualify for the federal tax aid, and a 22 percent bracket corporation with investment in qualifying equipment.

Example 1 in Appendix A demonstrates that the rapid write-off provision is the equivalent of a 7.968 percent tax credit for investment in pollution control equipment with 15 year useful life for a corporation in a 48 percent tax bracket. On the other hand, rapid amortization will produce the equivalent of only a 3.653 percent tax credit for investment in the same facilities by a corporation in a 22 percent tax bracket, assuming a 10 percent discount factor in each case. And, of course, a corporation that utilizes fuel desulphurization techniques gets no tax credit at all.

B. *As a Direct Grant Program*

If section 169 were recast as a direct grant program for the parties described in *Example 1*, the description of the federal loan program would read as follows:

Every corporation that purchases a \$150,000 certified pollution control facility shall be eligible to receive a direct grant from the federal government upon the following terms:

1. If a corporation has profits in excess of \$25,000 for the year in question, the taxpayer will receive a federal grant of \$11,952;

2. If a corporation realizes less than \$25,000 in profits for the year in question, it will receive a federal grant of \$5,479;

3. If a corporation has no taxable income or suffers a loss for the year in question, then it will receive no aid from the federal government;⁵⁰

4. If the corporation pursues alternative pollution control measures not involving the acquisition of pollution abatement facilities, the government will provide no financial assistance at all.

It is difficult to postulate a Congressman or Senator voting for a direct grant system structured on the above model. Yet, this is, in effect, what Congress did when it included Section 169 as part of the Tax Reform Act of 1969.

C. *As an Interest-Free Loan*

Section 169 can also be viewed as an interest-free loan by the federal government in the amount of the taxes which would have been paid had regular depreciation been taken for tax purposes during the five-year rapid write-off period. The loan is repaid in subsequent years (years 6-15) when the corporation has already written off the cost of the facility and must forego depreciation deductions to which it would ordinarily be entitled.

Example 2 in Appendix A illustrates the amount of interest saving that is derived from the rapid amortization provision. Again, the upside-down effect of the tax benefit is apparent. A corporation in the 48 percent bracket is awarded a government loan that saves \$24,038.70 in interest which the government foregoes to collect. But the 22 percent bracket corporation derives only \$11,029.10 in interest savings on the government loan. And, again, the government loan is simply not available to the corporation with a net operating loss; it must go into the regular commercial money market for funds with which to acquire antipollution equipment.

Nor does the amount of the loan have any relation to the problem

⁵⁰ Aid might be available in a subsequent year if the corporation realized profits to correspond to tax loss carryover benefits. Int. Rev. Code of 1954, § 172.

When a corporation using §169 sells the pollution control facility, the total amortization deductions which it took must be recaptured as ordinary income under §1245 of the Code. When a corporation receiving a direct grant (as hypothesized in the text) sells its property, the total depreciation deductions which it took, probably under the double-declining balance method, must also be recaptured as ordinary income under § 1245. If the sale takes place within 15 years of the date of purchase, less is recaptured as ordinary income by the corporation receiving the direct grant than the corporation using § 169, assuming both corporations sell their property at the same time, since theoretically the government grant should be included as taxable income by the grantee.

of pollution control or indeed to the size of the business operation, since heavy losses could conceivably place a very large business in the lower tax bracket. Thus, section 169 gives the least help to corporations which are most in need of government aid—smaller corporations or corporations with no taxable income.

D. As a Reduction in Interest Rates on Traditional Financing

Finally, section 169 can be viewed as a federal loan program for the full capital costs of the pollution control facilities but at interest rates below commercial levels. *Example 3* in Appendix A illustrates the effect of recasting the five-year rapid write-off provision as a reduction in interest rates on a 100 percent mortgage at a 10 percent interest rate for the life of the facility for a 48 percent and 22 percent bracket corporation respectively.

This example illustrates the contours of the direct loan program that the Departments of the Interior and HEW would be required to ask for if they were to model it on the present tax provisions. These Departments would be saying to Congress that they should be authorized to loan funds for pollution control equipment to corporations with more than \$25,000 in profits at an interest rate of 7.986 percent. But corporations with less profit would be required to pay an interest rate of 9.384 percent. Corporations with a loss must pay the full 10 percent interest charge.⁵¹

E. Impact of the Minimum Tax

Congress, interestingly enough, recognized the adverse impact on tax equity of section 169 by providing that the new minimum tax be applied to the excess of rapid amortization over other forms of allowable depreciation.⁵² The minimum tax can thus be viewed as the "interest" which the government is charging for its "loan."⁵³ However, the minimum tax does not cure the inequity in section 169 for the amount and the incidence of this tax "interest" are highly arbitrary and erratic in operation.

If the 10 percent minimum tax is regarded as the "interest" on the loan, the effective interest rate is substantially lower than the market rate of interest. *Example 2* in Appendix A illustrates a situa-

⁵¹ For a similar analysis of § 167k of the Code (dealing with the 5-year amortization of rehabilitation expenses for low cost rental housing), see Hearings on H.R. 13270, supra note 25, pt. 5, at 4906-907 (statement of Charles Davenport).

Of course, each of the programs as recast in the text will vary in amounts depending upon the actual discount factor applicable to a given corporation, the useful life of the property involved, and its cost.

⁵² Int. Rev. Code of 1954, § 57(a)(4). Rather curiously, the tax preference element is apparently defined as the excess of rapid amortization over accelerated depreciation rather than over straight-line depreciation as in the case of real estate.

⁵³ Report of Senate Comm. on Finance, supra note 34, at 250.

tion where neither Corporation *A* nor Corporation *B* will pay any "interest" because the difference between the rapid amortization deduction and the double-declining balance deduction never exceeds the \$30,000 exemption of Section 56(a)(1) of the Code. More generally, it is difficult to determine any rational policy behind a loan system that imposes an interest charge on the basis of the relationship between, say, the amount of percentage depletion a taxpayer claims and his regular taxes paid.

Even if the difference between the rapid amortization deduction (plus other tax preferences) and the double-declining balance deduction exceeded the \$30,000 exemption and income taxes for the year, the 10 percent "interest" charge must be divided by the term of the loan to determine the effective interest rate. Assume, for example, that Corporation *A* in *Example 2* has, under section 56(a)(1), other items of tax preference, so that the net tax savings for year 1 (\$4,739) which results from using rapid amortization in lieu of double-declining balance depreciation is subject to the 10 percent minimum tax. Hence, the "interest" charge payable in year 1 is \$473.90. This interest is all prepaid since the loan is comprised of a \$4,631 loan for five years and a \$108 loan for six years (see Chart III, *Example 2*). The actual annual

interest rate on the \$4,631 loan is two percent $\left(\frac{10\% - \text{minimum tax}}{5 - \text{term of loan}} \right)$,

while on the \$108 loan it is 1.667 percent $\left(\frac{10\% - \text{minimum tax}}{6 - \text{term of loan}} \right)$. If

Corporation *A* in the example did not incur a minimum tax until year 3, the "interest" burden would, of course, be different. But one searches in vain for any rational explanation for the variances either in terms of federal tax or lending policy. In any event, the minimum tax can hardly be viewed as a rational interest increment if the rapid amortization privilege is viewed as a government loan program.

VI. SECTION 169 AS A FORM OF FEDERAL COST SHARING

Analysis of the new rapid write-off privilege for pollution control facilities as a tax expenditure reveals its adverse impact on tax equity in the federal corporate income tax system, and its inherent irrationality when viewed as a program of direct federal financial assistance. Nonetheless, it is necessary to explore the effectiveness and efficiency of the section 169 mechanism in dealing with the problems of air and water pollution. For proponents of tax expenditures argue that use of the tax system will permit the task at hand to be attacked by private industry more efficiently and effectively than if direct federal financing programs are involved.

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Although the avowed purpose of section 169 is to offer private industry an incentive to install pollution abatement equipment, it is doubtful that this tax expenditure will stimulate such investment.⁵⁴ Unlike the seven percent investment tax credit which applied to profit-making as well as non-profit-making investments, section 169 applies only to the latter category. The statute specifically states that property is not eligible for rapid amortization "to the extent that it appears that by reason of profits derived through the recovery of wastes or otherwise in the operation of such property, its costs will be recovered over its actual useful life."⁵⁵ Since pollution control equipment is generally an economic loss item, the federal tax assistance will merely reduce the amount of the loss which would be incurred by industry absent such assistance. Businessmen do not ordinarily invest in unprofitable ventures regardless of the fact that losses will be limited. In making investment decisions, businessmen usually compare anticipated rates of return on alternative investments and choose the project with the highest projected rate of return. Since an investment in a "certified pollution control facility" is by definition an investment in a venture with little or no return, it is unlikely that industrialists not otherwise disposed toward making such an investment will be induced to make the investment as a result of the available tax assistance.

The only real incentives for investment in pollution control facilities are: (1) the favorable effect which such investment should have on public relations; (2) the avoidance of the time and money costs of enforcement proceedings in connection with local regulations; (3) the preservation of amicable relations with the federal, state and local governments; and (4) the manager's personal satisfaction in realizing that he has made a contribution toward the improvement of environmental quality.⁵⁶ Opposed to these incentives are three positive reasons for industry to refuse to invest in pollution control facilities. First, more generous direct federal aid may be available to industry in the future if federal defense spending declines relatively and as the pollution problem becomes more acute. Second, research presently being done should provide the basis for pollution control strategies less costly and more efficient than present pollution abatement methods. Third, delay allows a firm to invest in alternative profit-making investments and to save the operating expenses which would have to be

⁵⁴ For a discussion of the argument that tax incentive schemes do not provide real incentives to change behavior, see ABT Associates, Inc., *Incentives to Industry for Water Pollution Control: Policy Considerations* 41-42 (1967) Roberts, *supra* note 4, at 1530-532.

⁵⁵ Int. Rev. Code of 1954, § 169(e).

⁵⁶ Roberts, *River Basin Authorities: A National Solution to Water Pollution*, 83 Harv. L. Rev. 1527, 1531 (1970).

incurred to run and maintain pollution control facilities.⁵⁷ Thus, the incentive effect of section 169 is questionable at best.⁵⁸

The justification for the new provision must, therefore, rest on the assertion that it is the best means of cost-sharing available. It is necessary here to consider two preliminary questions. One, should the public bear a significant part of the cost of industrial pollution abatement? Two, is the projected cost to industry of effective pollution control so large as to warrant additional federal cost-sharing, however erratic?

With respect to the first question, it is clear that section 169 is bottomed on the assumption that the public should bear a significant share of the cost of pollution control in the form of foregone taxes. Many economists, on the other hand, assert that the direct cost of abating industrial pollution should largely be borne by industry. Professor Roberts of Harvard University cogently summarizes this argument as follows:

Tax incentives are also inefficient in an economic sense . . . in that they shift the cost of abatement from the polluter and the consumers of his goods to the government. In so doing such schemes interfere with market adjustments which would otherwise lead to production of the "correct" bundle of goods and services for society. For years now polluting firms have been imposing costs on the users of streams and rivers in the form of the wastes they add to the water. These wastes interfere with recreation and make it unpleasant for all who encounter the dirty water. Who benefits from this dirty water? The answer is those individuals who purchase the goods whose production generated the pollution, as well as those individuals who "own" inputs (capital, land, or labor) that have special usefulness in producing these goods. At the moment these individuals do not pay for the "external" costs they impose on others. The logic of economic efficiency indicates that in the long run consumers and producers of pollution-creating products should pay prices that reflect the real total costs to society of producing the goods in question including the cost of abating their pollution. Thus, subject to some complicated theoretical economic qualifications, the prices of pollution-producing goods should rise enough to cover the cost of controlling that pollution. To the extent that tax incentives or other federal grants

⁵⁷ Id. at 1530.

⁵⁸ See p. 353 *supra* for a discussion of Secretary Finch's opposition to tax incentives.

reduce the costs of pollution-producing goods, a nonoptimal set of goods will be produced for society.⁵⁹

With respect to the second question, it should be noted that the public is already providing cost-sharing benefits to industry in programs quite apart from special tax incentives through research, low interest loans and direct grants.⁶⁰ Furthermore, as noted earlier, the 1967 federal interagency report estimated that the average additional annual cost caused by pollution abatement is significant but relatively small for all manufacturing firms.⁶¹ The report concluded that the annual cost of effective air and water pollution abatement would be less than one-third of one percent of value-added by all manufacturing and electric power industries.⁶² Although the report indicates that some industries will experience substantially higher costs, it concluded that federal assistance on an industry-wide basis is not presently needed. The most promising approach would appear to be a low-cost loan program directed at particular marginal situations where the costs of compliance with antipollution regulations produce a significant economic hardship.

Even if one reaches the conclusion that the public should properly bear a large part of the cost of industrial pollution abatement, and that the cost to industry is sufficiently large as to warrant additional federal cost-sharing, there are a number of defects in the rapid amortization provision which militate against its use.

A fundamental defect of section 169 results from the misallocation of economic resources that it produces. From the standpoint of businessmen's decision-making, it is important that the tax system remain neutral. The tax system violates this principle when special benefits provide a greater after-tax rate of return for one of two possible investments solely because of the tax gain so generated. If economic neutrality is violated, resource use will differ from that which would result if the tax system were more nearly neutral.⁶³

Section 169 violates economic neutrality since a businessman, in comparing two types of pollution abatement expenditures, may select methods involving capital outlays rather than, say, more efficient use of present facilities, solely because the tax benefit goes to the first and

⁵⁹ Roberts, *supra* note 56, at 1535-536 (footnotes omitted).

⁶⁰ For a summary of federal pollution abatement programs, see S. Degler & S. Bloom, *Federal Pollution Control Programs: Water, Air, and Solid Wastes* (1969). See also *Cost Sharing with Industry?*, *supra* note 21, at 6-11.

⁶¹ *Cost Sharing with Industry?*, *supra* note 21, at 1.

⁶² *Id.* at 3. The hypothetical standards used in the study require 85% removal of biochemical oxygen demanding wastes and suspended solids from water and a 60% to 75% reduction of human exposure to sulphur oxides and particulate pollutants in all Standard Metropolitan Statistical Areas.

⁶³ See generally *Federal Tax Policy for Economic Growth and Stability*, S. Rep. No. 1310, 84th Cong., 2d Sess. 8 (1956).

not the second type of expenditure. To the extent that the new provision induces certain types of investments it may be an inefficient method of combatting air and water pollution. In order to qualify for special treatment under section 169, the pollution control facility must be a "new identifiable treatment facility which is used . . . to abate or control water or atmospheric pollution or contamination by removing, altering, disposing, or storing of pollutants, contaminants, wastes, or heat. . . ."⁶⁴ A "new identifiable treatment facility" is further defined as depreciable tangible property.⁶⁵ As noted above, qualified facilities exclude buildings and their structural components unless used exclusively as a treatment facility,⁶⁶ facilities which only disperse pollution, as opposed to facilities that abate pollution,⁶⁷ and facilities that remove pollutants, such as sulphur, from fuel.⁶⁸

Section 169 thus encourages corporations to invest in capital-oriented projects for abating pollution, and to neglect other important and often less costly and more efficient ways of controlling pollution. This is a result of the fact that capital expenditures are made artificially less expensive relative to other techniques by virtue of the five-year amortization provision. Correspondingly, the real cost of pollution control to society will be higher than it would have been without the tax aid.⁶⁹ For example, section 169 provides no tax advantage for the following pollution control practices which might be less costly and more effective than investment in "new identifiable treatment facilities": (1) purchasing land on which to construct treatment ponds;⁷⁰ (2) chemical precipitation;⁷¹ (3) labor for operation and maintenance;⁷² (4) labor for more careful control of production processes;⁷³ (5) use of dispersion equipment such as high smokestacks;⁷⁴ and (6) fuel substitution.⁷⁵ The last alternative is the least costly method in more

⁶⁴ Int. Rev. Code of 1954, § 169(d)(1).

⁶⁵ Int. Rev. Code of 1954, § 169(d)(4).

⁶⁶ *Id.*

⁶⁷ S. Rep. No. 552, *supra* note 34, at 250.

⁶⁸ *Id.*

⁶⁹ For a discussion of this point see Roberts, *supra* note 56, at 1532-533.

⁷⁰ ABT Associates, Inc., *supra* note 54, at 42-43. See also note 31 *supra*. There have, however, been a few cases which have held that building the ponds themselves by throwing up earthen dikes may be depreciated. See, e.g., *Union Elec. Co. v. Commissioner*, 177 F.2d 269 (8th Cir. 1949) (dams); *Quito Elec. Light & Power Co.* 10 B.T.A. 538 (1928) (dams and canals).

⁷¹ ABT Associates, Inc., *supra* note 54, at 43.

⁷² *Id.*

⁷³ *Id.*

⁷⁴ Address of Douglas B. Wilson, Tax Institute of America Symposium, Princeton, N.J., Nov. 21, 1969. See also note 32 *supra*.

⁷⁵ *Id.* The distortion effect on the businessman's decision-making process can be illustrated as follows. Assume a business with \$100 gross income, fuel costs of \$10 and depreciation of \$10. The manager has a choice of increasing fuel costs to \$15 per year or of making an additional capital investment of \$75 in 15 year useful life pollution

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than 50 percent of the cases involving sulphur oxide air pollution abatement.⁷⁶

Another important infirmity of section 169 is that it provides little incentive for a corporation to utilize changes which add to plant output while reducing pollution. In some industries, over 50 percent of the lowest-cost opportunities for reducing waste load discharges are found in such process changes.⁷⁷ It is doubtful whether a facility would qualify under section 169 if it has two functions, that is, increasing output and reducing pollution. The Report of the Senate Finance Committee states explicitly that "a pollution control facility does not include any facility which serves any function other than pollution abatement."⁷⁸ The section itself disqualifies facilities whose costs are recovered through the sale of wastes or otherwise.⁷⁹ It has even been suggested that this bias in section 169 might so reduce the incentive to use process changes that enough extra waste would be produced to offset the increase in treatment capacity resulting from the incentive.⁸⁰

The tax expenditure also fails to reward economies in pollution control which derive from regional cooperation and central treatment facilities operated by a municipality or other government agency. Section 169 might make it less expensive after taxes for a corporation to invest in its own facilities rather than to have its waste treated by a central agency, even though before taxes central treatment charges were lower. If these charges reflect the real costs to the central agency of treating the wastes of the plant, then more resources will have been used than necessary to achieve the pollution control objectives of the country.⁸¹

Yet another way in which section 169 distorts business decision-making is its inherent bias for property having a long useful life. Although the Conference Committee ameliorated the problem by limiting the amortizable basis to the proportionate part of the adjusted basis which is represented by the first 15 years of the normal useful

abatement equipment. In the absence of rapid amortization, taxable income would be the same under either decision (assuming straight-line depreciation), and the question would be whether it is more desirable to expend a greater sum currently to be recovered over the life of the property or to expend a lesser sum now but with increased fuel costs over the next 15 years. However, the presence of § 169 distorts the decision since, while the capital costs could now be recovered in 5 years rather than 15, the change in fuel method will still result in increased costs for 15 years. The discounted present cost of each technique has now changed relatively and the manager may find it more beneficial to utilize depreciable equipment than fuel changes, solely because of the tax provision.

⁷⁶ See note 74 *supra*.

⁷⁷ *Id.*

⁷⁸ Report of Senate Comm. on Finance, *supra* note 34, at 250.

⁷⁹ Int. Rev. Code of 1954, § 169(e).

⁸⁰ ABT Associates, Inc., *supra* note 54, at 43.

⁸¹ Roberts, *supra* note 56, at 1534-535.

life of such property, it did not completely eliminate this bias. For example, section 169 offers the greatest benefit to property with a life of 15 years or more. It offers no benefit to property with a life of five years or less. While the 15-year-life rule held down the revenue cost of the measure, it can hardly be viewed as a rational approach to pollution abatement.

Aside from these economic defects, there are other problems with the approach adopted in section 169. First, the provision is inefficient in providing tax benefits to all corporations regardless of whether the corporation would have purchased the equipment without the tax benefits. As mentioned earlier, the primary incentive for a manufacturer to install antipollution devices is not the availability of a tax benefit, but the avoidance of local regulatory enforcement proceedings with attendant bad publicity. Thus, section 169 gives a windfall to corporate taxpayers for doing something that they would have done without the tax incentive.

Section 169 is not targeted to meet priority areas. Some industries and corporations account for more pollution than others. For example, transportation industries account for more air pollution than manufacturing industries.⁸² Some cities and states are more polluted than others. The new provision does not allow the federal government to direct aid or assistance to priority areas. In a sense, this failure can also be considered a misallocation of scarce resources.

One of the most critical deficiencies of section 169 is that Congress has very little control over the extent and nature of the assistance which it is granting. The technology of pollution abatement has not reached the point where a definite strategy can be followed. When this fact is considered in conjunction with the diverse pollution problems in different localities and the various possible abatement techniques, it is obvious that the keynote of a sound policy must be *flexibility*. Unfortunately, section 169 commits the country to an inflexible method which, because it is embedded in the tax system, automatically affords it first priority on available government revenues.

A sound pollution abatement policy must also be subject to constant scrutiny and evaluation, so that priorities can be established on a rational basis. The tax expenditure for industry using section 169 is not part of the federal budget and thus it is difficult for the public to evaluate the nature and extent of the aid.⁸³

⁸² Address of Douglas B. Wilson, *supra* note 74.

⁸³ One of the arguments which proponents of § 169 use is that it involves little government supervision or "red tape." The basis for this assertion is unclear, for in order to qualify a facility under § 169, it is necessary that the facility be certified by the appropriate state and federal authorities. Also, government supervision can be as tight or as loose under a tax program as under a direct expenditure program. This

VII. POLLUTION, POLITICS AND TAX POLICY

The rapid amortization privilege for pollution control facilities appears to be an ill-advised response to the pollution problem. As a tax expenditure, it violates the integrity of the federal corporate income tax system, with resultant distortions in tax equity. As a system of federal cost sharing, it is an inefficient and ineffective vehicle for providing federal financial assistance in the vital battle against air and water pollution. The above analysis suggests that any attempt to utilize the federal tax system as a means of financing the pollution effort will suffer the same infirmities. In a time of strong pressures on the federal budget it is therefore unfortunate that Congress saw fit to allocate annually over \$100 million—some 10 percent of the amount now directly expended for the pollution problem—of our national resources in this fashion.

But if the foregoing analysis of section 169 is correct, the question that remains is why Congress would enact such a provision. The answer lies in the political potency that the antipollution effort has amassed. Senators and Representatives could not vote against a measure that had the label "pollution control" affixed to it. Since the Senate Finance Committee approved the provision as part of the Tax Reform Act of 1969 there was little chance to strike the measure on the Senate floor. Issues of tax equity, efficiency and effectiveness could not stand up to pollution control in political terms.

Senator Gore did try to eliminate the five-year rapid write-off from the bill.⁸⁴ But his amendment was overwhelmingly defeated.⁸⁵ The problem that those concerned with tax fairness face when dealing with a tax preference for activities that have a strong claim on the nation's social and economic resources was exemplified by Senator Muskie's position on the Gore amendment. Muskie consistently voted for tax reform throughout consideration of the Tax Reform Act. But he abandoned tax equity in favor of dollars for the antipollution effort. In declaring his opposition to Gore's proposal to delete the new rapid write-off provision, Muskie declared:

Mr. President, I rise to oppose that portion of the Gore amendment which has to do with the amortization of pollution control facilities in the case of both air and water.

As chairman of the Subcommittee on Air and Water Pollution, I have been concerned . . . with the problem of stim-

argument is really nothing more than an assertion that government supervision should be kept at a minimum, a goal which can be reached by using either tax or direct expenditures.

⁸⁴ 115 Cong. Rec. S15394-5396 (daily ed. Dec. 6, 1969).

⁸⁵ 115 Cong. Rec. S16207 (daily ed. Dec. 9, 1969).

ulating the construction of waste treatment facilities in the public sector

Although in the subcommittee we do not have jurisdiction over tax legislation, the subcommittee—going back to 1966 in the report on the 1966 Clean Water Restoration Act—has advocated tax incentives to mount an industrial effort comparable to the public effort. . . .

This tax relief is only a stimulation to industry to make the investments called for by air and water quality standards.⁸⁶

Muskie's position on section 169 illustrates the problem that faces those concerned with and responsible for maintenance of the integrity of the federal income tax system each time a proposal is made to provide a tax incentive to assist in meeting the social and economic problems that confront our nation—whether it be education, housing, unemployment, or some other social need. A vote against the tax preference appears to be a vote against the underlying substantive problem. Advocates of a fair tax system thus must adequately arm themselves with data and arguments—cast in politically persuasive terms—to demonstrate the inadequacy of the particular tax approach in terms of meeting the social problem itself.

VIII. THE TASK AHEAD

Congress, in enacting new section 169, placed a five-year life on the measure to insure congressional review of the effectiveness of the provision before it becomes a permanent aspect of the tax structure. Although in our view the passage of the present provision was ill advised, the provision is now in the law. The task to be undertaken in the next five years is to develop data that can provide a basis for congressional decision-making when section 169 is reviewed.

The first order of business is to pose the questions, the exploration of which will provide Congressmen and Senators with the needed information concerning the operation of section 169. The following are submitted as a starting point for analysis.⁸⁷

1. What was the actual cost in revenues of the rapid write-off?
2. What portion of the actual cost of pollution control equipment with respect to which the special deduction was claimed was represented by this federal share?

⁸⁶ *Id.* at 16204-6205. For the full debate on the Gore amendment, see 115 Cong. Rec. S15394-5396, 16095-6099, 16202-6207 (daily ed. Dec. 6, 8-9, 1969).

⁸⁷ The authors are indebted to Professor Marc J. Roberts of Harvard University and Professor Stanley S. Surrey of the Harvard Law School for their valuable assistance in formulating this suggested line of questions.

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3. What corporations utilized the provision in terms of size, financial position, industrial classification and geographical location?

4. What kinds of pollution control equipment were acquired? In terms of antipollution technology, how did the devices compare to other forms of pollution control measures that did not qualify for special tax consideration?

5. Were devices qualifying for the rapid write-off installed as the result of local, state or federal regulatory requirements? Did the devices go beyond minimum requirements?

6. Would businesses have used alternative methods of pollution control in the absence of the rapid write-off?

7. What amount of the rapid amortization claimed fell into the minimum tax base?

8. In terms of cleaning up industrial pollution, is there a need for federal financial aid? Do all corporations need the same amount and kind of aid? All industries? Did the tax benefits go to the corporations that were found to need financial aid?

9. What part of the total air and water pollution problem is caused by industrial pollution? Does the problem vary in different geographical areas? What is the correlation between this data and the answers to question 2, *supra*?

The above questions provide a general framework for reference. But specific data must be acquired from industry if Congress is to be able to evaluate section 169 prior to its expiration. Who should collect the data? The most logical agencies would appear to be the offices responsible for certifying to the Treasury that pollution control equipment qualifies for the special deduction.⁸⁸ With each application for certification, the responsible agencies could require information to be submitted with respect to the questions outlined above.

Specifically, information should be required with respect to each property as to its cost, its useful life and its exact geographical location. The company should be required to state whether it had ever been involved with regulatory proceedings under state or local law concerning the particular plant, whether in the form of enforcement proceedings or abatement conferences. Information as to the timing of installing the equipment should be elicited, for example, the date on which the management or the board of directors approved the facility and the dates when the principal components were acquired. The existence and cost of any available municipal or regional disposal facilities should also be ascertained. Did the business consider these alternatives and why did it reject them?

Such data would help to answer the basic question whether sec-

⁸⁸ Int. Rev. Code of 1954, § 169(d)(3); See also note 37 *supra*.

tion 169 in fact operates as an incentive, whether it was effectively utilized where the need was greatest, and whether it encourages the most efficient utilization of resources to meet pollution problems.

Since section 169 is a tax measure it might be thought that the Treasury and Internal Revenue Service should be the data-collecting agencies. The agencies responsible for certification appear to be superior collecting resources however. The issues involved in analyzing section 169 are really economic and technical in nature, more than tax. Further, reliance on the Internal Revenue Service will require the development of considerably more sophisticated tax forms than are now being used. For 1970, the corporate tax return, Form 1120, simply requires a listing of the total amortization deductions claimed,⁸⁹ with an explanatory schedule to be attached. It would be an arduous task to try to locate those returns for examination and extract useful data therefrom. If the Internal Revenue Service is to be utilized as the data-collecting agency, Congress should specifically authorize and require the Service to act so that forms can be revised for 1971, and thereafter to facilitate computer print outs of relevant data.

It is obvious that the necessary data is of a mixed nature. Some of the information is purely factual—cost, useful life, and the like. But other important information is necessary to determine business motives and intent. It is thus essential that skilled public survey personnel participate with economists and engineers in developing the questionnaires.

Once the data is collected it must be analyzed. Here, Congress should utilize outside resources, such as economists and research organizations concentrating on the pollution problem, as well as government agencies such as Treasury, HEW, Interior and the Office of Management and Budget.

The importance of establishing criteria *now* for evaluating section 169 cannot be overstated. It will be too late if we wait until 1974. And it would be singularly unfortunate if section 169 is reviewed in the data vacuum that existed during its passage in 1969. In the absence of concrete data and informed evaluation thereof, the congressional policy-makers will be able to do little more than weigh the politics of pollution against tax equity, without any real basis for informed judgment as to whether the price paid in tax fairness was worth the benefits derived in terms of greater pollution control.

⁸⁹ Form 1120, line 20, simply requires a total of all amortization deductions claimed. Thus, this figure will include deductions for exploration and development expenditures (§§ 615-617), research or experimental expenditures (§ 174), trademark and tradename expenditures (§ 177), certified coal mine safety equipment (§ 187), and railroad rolling stock (§ 184). Hence, the task of extracting the necessary information from present tax returns would be extremely difficult and laborious.

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APPENDIX A

Example 1

Assumptions:

1. Property with cost of \$150,000 purchased on the first day of the tax year.
2. Discount rate of ten percent.
3. Normal useful life of property is 15 years with no salvage value.
4. Corporation *A* is in the 48 percent tax bracket while Corporation *B* is in the 22 percent tax bracket.
5. Neither Corporation *A* nor Corporation *B* is subject to the 10 percent minimum tax on tax preferences.⁹⁰
6. Corporations *A* and *B* have both elected to take an additional first year 20 percent depreciation deduction.⁹¹
7. Both Corporation *A* and Corporation *B* would have used double-declining balance method of computing depreciation if they had not opted for utilization of five-year amortization.⁹²
8. The tax surcharge on corporate income has been disregarded.⁹³

Corporation A

I. Double Declining Balance Depreciation for Years 1-5:

Year 1	\$21,728 ⁹⁴
Year 2	17,099

⁹⁰ Tax Reform Act of 1969, Pub. L. No. 91-172, § 301, 1 U.S. Code Cong. & Ad. News 623-30 (1969) (codified at Int. Rev. Code of 1954, §§ 56-58). This section imposes a 10% tax on certain tax preference items including the difference between the rapid amortization deduction and the deduction otherwise allowable under § 167 of the Code. In figuring the 10% minimum tax, the total of tax preference items must be reduced by a \$30,000 exemption and by the normal income tax for the year in question.

⁹¹ Under § 179 of the Code, any taxpayer may elect to write off 20% of the cost or portion of the cost of tangible personal property for the first taxable year for which a depreciation deduction is allowable to the taxpayer, in addition to the regular depreciation on the balance. A taxpayer who elects the five-year rapid write-off for pollution control equipment is also eligible for the additional 20% depreciation deduction. The additional 20% allowance applies to tangible personal property to the extent of \$10,000 of cost or portion of the cost with a remaining useful life of at least 6 years. The additional depreciation is computed on the basis of the cost of the property without reduction for salvage value. The remaining cost, after reduction of the additional first year depreciation and salvage value, may be depreciated under the straight-line, double-declining balance, sum-of-the-years digits, or any other method of depreciation allowable under § 167 of the Code.

⁹² Under § 167 of the Code a taxpayer may elect to depreciate tangible personal property by using the straight-line, double-declining balance or sum-of-the-years digits methods. Under the double-declining balance method, depreciation is assumed to be greatest in the first year and smaller in each succeeding year. The depreciation basis is reduced each year by the amount of the depreciation deduction and a uniform rate equal to 200% of the straight-line rate is applied to the resulting balances.

⁹³ The Tax Reform Act of 1969 extended the tax surcharge until June 30, 1970 at a 5% annual rate for corporations. Pub. L. No. 91-172, § 701, 1 U.S. Code Cong. & Ad. News 717-20 (1969) (codified at Int. Rev. Code of 1954, § 51(a)).

⁹⁴ The total depreciation deduction for year 1 of \$21,728 includes the first year additional 20% deduction of the first \$10,000 in cost of the property.

Year 3	14,819
Year 4	12,844
Year 5	11,132

II. Value of the Depreciation Deduction for Years 1-5:

Year 1	(\$21,728) (.48) = \$10,429
Year 2	(17,099) (.48) = 8,208
Year 3	(14,819) (.48) = 7,113
Year 4	(12,844) (.48) = 6,165
Year 5	(11,132) (.48) = 5,343

III. Five-Year Rapid Amortization Under Section 169 of the Internal Revenue Code:⁹⁵

Year 1	\$31,600 ⁹⁶
Year 2	29,600
Year 3	29,600
Year 4	29,600
Year 5	29,600

IV. Value of the Amortization Deduction Under Section 169 for Years 1-5:

Year 1	(\$31,600) (.48) = \$15,168
Year 2	(29,600) (.48) = 14,208
Year 3	(29,600) (.48) = 14,208
Year 4	(29,600) (.48) = 14,208
Year 5	(29,600) (.48) = 14,208

V. Net Savings Per Year During Years 1-5 Using Rapid Amortization in Lieu of Regular Depreciation:

Year 1	\$15,168 minus \$10,429 = \$ 4,739
Year 2	14,208 minus 8,208 = 6,000
Year 3	14,208 minus 7,113 = 7,095
Year 4	14,208 minus 6,165 = 8,043
Year 5	14,208 minus 5,343 = 8,865

VI. Present Value of Net Savings Per Year During Years 1-5 Using Rapid Amortization in Lieu of Regular Depreciation:

Year 1	(\$4,739) (.909) = \$ 4,308
Year 2	(6,000) (.826) = 4,956
Year 3	(7,095) (.751) = 5,328
Year 4	(8,043) (.683) = 5,493
Year 5	(8,865) (.621) = 5,505
Total Savings	<u>\$25,590</u>

⁹⁵ The amount of the amortization deduction for each year is calculated by dividing the total cost less the additional first year depreciation by five.

⁹⁶ The first year depreciation deduction of \$31,600 includes \$2,000 of additional first year depreciation (20% of \$10,000).

TAX INCENTIVES FOR ENVIRONMENTAL PROTECTION

VII. Double-Declining Balance Depreciation for Years 6-15 (if section 169 had not been used):

Year 6	\$ 9,648
Year 7	8,362
Year 8	7,257
Year 9	6,730 ⁹⁷
Year 10	6,730
Year 11	6,730
Year 12	6,730
Year 13	6,730
Year 14	6,730
Year 15	6,731

VIII. Value of the Depreciation Deduction for Years 6-15 (net reduction in loss of depreciation deduction per year by using section 169):

Year 6	(\$9,648) (.48) = \$ 4,631
Year 7	(8,362) (.48) = 4,014
Year 8	(7,257) (.48) = 3,483
Year 9	(6,730) (.48) = 3,230
Year 10	(6,730) (.48) = 3,230
Year 11	(6,730) (.48) = 3,230
Year 12	(6,730) (.48) = 3,230
Year 13	(6,730) (.48) = 3,230
Year 14	(6,730) (.48) = 3,230
Year 15	(6,731) (.48) = 3,230

IX. Present Value of Net Loss of Depreciation Deduction Per Year During Years 6-15:

Year 6	(\$4,631) (.564) = \$ 2,616
Year 7	(4,014) (.513) = 2,059
Year 8	(3,483) (.467) = 1,627
Year 9	(3,230) (.424) = 1,370
Year 10	(3,230) (.386) = 1,247
Year 11	(3,230) (.320) = 1,131
Year 12	(3,230) (.319) = 1,030
Year 13	(3,230) (.290) = 937
Year 14	(3,230) (.263) = 849
Year 15	(3,230) (.239) = 772
Total Net Loss	<u>\$13,638</u>

⁹⁷ Under § 167(e)(1) of the Code, a taxpayer may at any time elect to change his depreciation method from double-declining balance to straight-line. This election usually occurs in the year in which the amount of the deduction under double-declining balance is less than the amount that could be deducted if the adjusted basis were depreciated using the straight-line method for the remaining useful life. In the hypothetical example, the election would occur in year 9.

X. Present Value of Using Rapid Amortization in Lieu of Regular Depreciation:

$$\$25,590 \text{ minus } 13,638 = \$11,952$$

XI. Rapid Amortization Recast as an Investment Credit:

$$\frac{11,592}{150,000} = 7.968\%$$

Corporation B

I. Double Declining Balance Depreciation for Years 1-5:

Year 1	\$21,728
Year 2	17,099
Year 3	14,819
Year 4	12,844
Year 5	11,132

II. Value of the Depreciation Deduction for Years 1-5:

Year 1	(\$21,728) (.22) = \$ 4,780
Year 2	(17,099) (.22) = 3,762
Year 3	(14,819) (.22) = 3,260
Year 4	(12,844) (.22) = 2,826
Year 5	(11,132) (.22) = 2,449

III. Five-Year Rapid Amortization Under Section 169 of the Internal Revenue Code:

Year 1	\$31,600
Year 2	29,600
Year 3	29,600
Year 4	29,600
Year 5	29,600

IV. Value of the Amortization Deduction Under Section 169 for Years 1-5:

Year 1	(\$31,600) (.22) = \$ 6,952
Year 2	(29,600) (.22) = 6,512
Year 3	(29,600) (.22) = 6,512
Year 4	(29,600) (.22) = 6,512
Year 5	(29,600) (.22) = 6,512

V. Net Savings Per Year During Years 1-5 Using Rapid Amortization in Lieu of Regular Depreciation:

Year 1	\$6,952 minus \$4,780 = \$ 2,172
Year 2	6,512 minus 3,762 = 2,750
Year 3	6,512 minus 3,260 = 3,252
Year 4	6,512 minus 2,826 = 3,686
Year 5	6,512 minus 2,449 = 4,063

TAX INCENTIVES FOR ENVIRONMENTAL PROTECTION

VI. Present Value of Net Savings Per Year During Years 1-5
Using Rapid Amortization in Lieu of Regular Depreciation:

Year 1	$(\$2,172)(.909) = \$ 1,974$
Year 2	$(2,750)(.826) = 2,272$
Year 3	$(3,252)(.751) = 2,442$
Year 4	$(3,686)(.683) = 2,518$
Year 5	$(4,063)(.621) = 2,523$
Total Savings	<u>\$11,729</u>

VII. Double Declining Balance Depreciation for Years 6-15 (if
section 169 had not been used):

Year 6	\$ 9,648
Year 7	8,362
Year 8	7,257
Year 9	6,730
Year 10	6,730
Year 11	6,730
Year 12	6,730
Year 13	6,730
Year 14	6,730
Year 15	6,731

VIII. Value of Depreciation Deduction for Years 6-15 (net reduction
in loss of depreciation deduction per year by using section
169):

Year 6	$(\$9,648)(.22) = \$ 2,123$
Year 7	$(8,362)(.22) = 1,840$
Year 8	$(7,257)(.22) = 1,597$
Year 9	$(6,730)(.22) = 1,481$
Year 10	$(6,730)(.22) = 1,481$
Year 11	$(6,730)(.22) = 1,481$
Year 12	$(6,730)(.22) = 1,481$
Year 13	$(6,730)(.22) = 1,481$
Year 14	$(6,730)(.22) = 1,481$
Year 15	$(6,730)(.22) = 1,481$

IX. Present Value of Net Loss of Depreciation Deduction Per
Year During Years 6-15:

Year 6	$(\$2,123)(.564) = \$ 1,197$
Year 7	$(1,840)(.513) = 944$
Year 8	$(1,597)(.467) = 746$
Year 9	$(1,481)(.424) = 628$
Year 10	$(1,481)(.386) = 572$
Year 11	$(1,481)(.350) = 518$
Year 12	$(1,481)(.319) = 472$
Year 13	$(1,481)(.290) = 429$

Year 14	(1,481)(.263) =	390
Year 15	(1,481)(.239) =	354
Total Net Loss		<u>\$ 6,250</u>

X. Present Value of Using Rapid Amortization in Lieu of Regular Depreciation:

$$\$11,729 \text{ minus } \$6,250 = \$ 5,479$$

XI. Rapid Amortization Recast as an Investment Credit:

$$\frac{5,479}{150,000} = 3.653\%$$

Example 2

Assumptions:

1. Property with cost of \$150,000 purchased on the first day of the tax year.
2. Market rate of interest at 10 percent.
3. Corporation A is in the 48 percent tax bracket while Corporation B is in the 22 percent tax bracket.
4. Neither Corporation A nor Corporation B is subject to the 10 percent minimum tax on tax preferences.
5. Normal useful life of property is 15 years with no salvage value.
6. Corporations A and B have both elected to take an additional first-year 20 percent depreciation deduction.
7. Both Corporation A and Corporation B would have used the double-declining balance method of computing depreciation if they had not opted for utilization of five-year write-off.
8. The tax surcharge on corporate income has been disregarded.

Corporation A

I. Net Tax Savings Per Year During Years 1-5 Using Rapid Amortization in Lieu of Regular Depreciation—Amount of Loan:⁹⁸

Year 1	\$ 4,739
Year 2	6,000
Year 3	7,095
Year 4	8,043
Year 5	8,865
Total Loan	<u>\$34,742</u>

II. Net Tax Loss Per Year During Years 6-15 Using Rapid Amortization in Lieu of Regular Depreciation—Repayment of Loan:⁹⁹

Year 6	\$ 4,631
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⁹⁸ These figures appear on p. 376 *supra* (Corporation A, V).

⁹⁹ These figures appear on p. 377 *supra* (Corporation A, VIII).

TAX INCENTIVES FOR ENVIRONMENTAL PROTECTION

Year 7	4,014
Year 8	3,483
Year 9	3,230
Year 10	3,230
Year 11	3,230
Year 12	3,230
Year 13	3,230
Year 14	3,230
Year 15	3,230

Total Repayment \$34,738

III. Interest Saved on Loan or Deferral of Tax Liability:

1.	\$ 4,631 for 5 years =	\$ 2,315.50
2.	108 for 6 years =	64.80
3.	3,906 for 5 years =	1,953.00
4.	2,094 for 6 years =	1,238.40
5.	1,389 for 5 years =	694.50
6.	3,230 for 6 years =	1,938.00
7.	2,476 for 7 years =	1,733.20
8.	754 for 6 years =	452.40
9.	3,230 for 7 years =	2,261.00
10.	3,230 for 8 years =	2,584.00
11.	829 for 9 years =	746.10
12.	2,401 for 8 years =	1,920.80
13.	3,230 for 9 years =	2,907.00
14.	3,230 for 10 years =	3,230.00

Total Interest Saved \$24,038.70

Corporation B

I. Net Tax Savings Per Year During Years 1-5 Using Rapid Amortization in Lieu of Regular Depreciation—Amount of Loan:¹⁰⁰

Year 1	\$ 2,172
Year 2	2,750
Year 3	3,252
Year 4	3,686
Year 5	4,063

Total Loan \$15,923

II. Net Tax Loss Per Year During Years 6-15 Using Rapid Amortization in Lieu of Regular Depreciation—Repayment of Loan:¹⁰¹

Year 6	\$ 2,123
Year 7	1,840

¹⁰⁰ These figures appear on p. 378 supra (Corporation B, V).

¹⁰¹ These figures appear on p. 379 supra (Corporation B, VIII).

Year 8	1,597
Year 9	1,481
Year 10	1,481
Year 11	1,481
Year 12	1,481
Year 13	1,481
Year 14	1,481
Year 15	1,481
Total Repayment	<u>\$15,927</u>

III. Interest Saved on Loan or Deferral of Tax Liability:

1.	\$ 2,123 for 5 years =	\$ 1,061.50
2.	49 for 6 years =	29.40
3.	1,791 for 5 years =	895.50
4.	959 for 6 years =	575.40
5.	638 for 5 years =	319.00
6.	1,481 for 6 years =	888.60
7.	1,133 for 7 years =	793.10
8.	348 for 6 years =	208.80
9.	1,481 for 7 years =	1,036.70
10.	1,481 for 8 years =	1,184.80
11.	376 for 9 years =	338.40
12.	1,105 for 8 years =	884.00
13.	1,481 for 9 years =	1,332.90
14.	1,481 for 10 years =	1,481.00
Total Interest Saved		<u>\$11,029.10</u>

Example 3

Assumptions:

1. Property with cost of \$150,000 purchased on the first day of the tax year.
2. Discount Rate of 10 percent.
3. Normal useful life of property is 15 years with no salvage value.
4. Corporation *A* is in the 48 percent tax bracket while Corporation *B* is in the 22 percent tax bracket.
5. Neither Corporation *A* nor Corporation *B* is subject to the 10 percent minimum tax on tax preferences.
6. Corporations *A* and *B* have both elected to take an additional first-year 20 percent depreciation deduction.
7. Both Corporation *A* and Corporation *B* would have used the double-declining balance method of computing depreciation if they had not opted for utilization of five-year amortization.
8. The tax surcharge on corporate income has been disregarded.
9. Market rate of interest is 10 percent.
10. The loan is for \$150,000—the cost of the equipment.

TAX INCENTIVES FOR ENVIRONMENTAL PROTECTION

11. The term of the loan is 15 years—the normal useful life of the equipment.

12. X = Reduction in the rate of interest.

Corporation A

I. Interest Cost Per Year:

$$(\$150,000) (10\%) = \$15,000$$

II. Tax Savings Per Year Through Deducting Interest Cost:

$$(\$15,000) (48\%) = \$7,200$$

III. Net After-Tax Interest Cost:

$$\$15,000 \text{ minus } \$7,200 = \$7,800$$

IV. Present Value of Net After-Tax Interest Cost:

Year 1	$(\$7,800) (.909) =$	\$ 7,090
Year 2	$(7,800) (.826) =$	6,443
Year 3	$(7,800) (.751) =$	5,858
Year 4	$(7,800) (.683) =$	5,327
Year 5	$(7,800) (.621) =$	4,844
Year 6	$(7,800) (.564) =$	4,399
Year 7	$(7,800) (.513) =$	4,001
Year 8	$(7,800) (.467) =$	3,643
Year 9	$(7,800) (.424) =$	3,307
Year 10	$(7,800) (.386) =$	3,011
Year 11	$(7,800) (.350) =$	2,730
Year 12	$(7,800) (.319) =$	2,488
Year 13	$(7,800) (.290) =$	2,262
Year 14	$(7,800) (.263) =$	2,051
Year 15	$(7,800) (.239) =$	1,864
	Total	<u>\$59,318</u>

V. Present Value of Using Rapid Amortization in Lieu of Regular Depreciation:

$$\$11,952^{102}$$

VI. Present Value of Net After-Tax Interest Cost at Reduced Rate of Interest:

$$\$59,318 \text{ minus } \$11,952 = \$47,366.$$

VII. Interest Cost Per Year at Reduced Rate of Interest:

$$(\$150,000) (.10 - X) = \$15,000 - 150,000 X$$

VIII. Tax Savings Per Year Through Deducting the Interest at the Reduced Rate:

$$(15,000 - 150,000 X) (.48) = 7,200 - 72,000 X$$

¹⁰² See p. 378 *supra* (Corporation A, X).

IX. Net After-Tax Interest Cost at the Reduced Rate of Interest:

$$15,000-150,000 X - [7,200-72,000 X] = 15,000-150,000 X - 7,200 + 72,000 X = 7,800-78,000 X$$

X. Present Value of Net After-Tax Interest Cost at Reduced Rate of Interest:

Year 1—	(.909) (7,800-78,000 X) =	7,090- 70,900 X
Year 2—	(.826) (7,800-78,000 X) =	6,443- 64,430 X
Year 3—	(.751) (7,800-78,000 X) =	5,858- 58,580 X
Year 4—	(.683) (7,800-78,000 X) =	5,327- 53,270 X
Year 5—	(.621) (7,800-78,000 X) =	4,844- 48,440 X
Year 6—	(.564) (7,800-78,000 X) =	4,399- 43,990 X
Year 7—	(.513) (7,800-78,000 X) =	4,001- 40,010 X
Year 8—	(.467) (7,800-78,000 X) =	3,643- 36,430 X
Year 9—	(.424) (7,800-78,000 X) =	3,307- 33,070 X
Year 10—	(.386) (7,800-78,000 X) =	3,011- 30,110 X
Year 11—	(.350) (7,800-78,000 X) =	2,730- 27,300 X
Year 12—	(.319) (7,800-78,000 X) =	2,488- 24,880 X
Year 13—	(.290) (7,800-78,000 X) =	2,262- 22,620 X
Year 14—	(.263) (7,700-78,000 X) =	2,051- 20,510 X
Year 15—	(.239) (7,800-78,000 X) =	1,864- 18,640 X
Total		<u>59,318-593,180 X</u>

XI. Section 169 Recast as a Reduction in Interest Cost:

$$\begin{aligned} 59,318-593,180 X &= 47,366 \\ -593,180 X &= - 11,952 \\ X &= - 11,952 \end{aligned}$$

$$\begin{aligned} &-593,180 \\ X &= 2.014\% \\ 10\% - 2.014\% &= 7.986\% \end{aligned}$$

Corporation B

I. Interest Cost Per Year:

$$(\$150,000)(10\%) = \$15,000$$

II. Tax Savings Per Year Through Deducting Interest Cost:

$$(\$15,000)(22\%) = \$3,300$$

III. Net After-Tax Interest Cost:

$$\$15,000 \text{ minus } \$3,300 = \$11,700$$

IV. Present Value of Net After-Tax Interest Cost:

Year 1	(\\$11,700)(.909) =	\$10,635
Year 2	(11,700)(.826) =	9,664
Year 3	(11,700)(.751) =	8,787

TAX INCENTIVES FOR ENVIRONMENTAL PROTECTION

Year 4	(11,700) (.683) =	7,991
Year 5	(11,700) (.621) =	7,266
Year 6	(11,700) (.564) =	6,599
Year 7	(11,700) (.513) =	6,002
Year 8	(11,700) (.467) =	5,464
Year 9	(11,700) (.424) =	4,961
Year 10	(11,700) (.386) =	4,516
Year 11	(11,700) (.350) =	4,095
Year 12	(11,700) (.319) =	3,732
Year 13	(11,700) (.290) =	3,393
Year 14	(11,700) (.263) =	3,077
Year 15	(11,700) (.239) =	2,796
	Total	<u>\$88,978</u>

- V. Present Value of Using Rapid Amortization in Lieu of Regular Depreciation:

$$\$5,479^{108}$$

- VI. Present Value of Net After-Tax Interest Cost at Reduced Rate of Interest:

$$\$88,978 \text{ minus } \$5,479 = \$83,499$$

- VII. Interest Cost Per Year at Reduced Rate of Interest:

$$(\$150,000) (.10-X) = 15,000-150,000 X$$

- VIII. Tax Savings Per Year Through Deducting the Interest at the Reduced Rate:

$$(15,000-150,000 X) (.22) = 3,300-33,000 X$$

- IX. Net After-Tax Interest Cost at the Reduced Rate of Interest:

$$15,000-150,000 X - [3,300-33,000 X] = 15,000-150,000 X \\ - 3,300 + 33,000 X = 11,700-117,000 X$$

- X. Present Value of Net After-Tax Interest Cost at Reduced Rate of Interest:

Year 1—	(.909) (11,700-117,000 X) =	10,635-106,350 X
Year 2—	(.826) (11,700-117,000 X) =	9,664- 96,640 X
Year 3—	(.751) (11,700-117,000 X) =	8,787- 87,870 X
Year 4—	(.683) (11,700-117,000 X) =	7,991- 79,910 X
Year 5—	(.621) (11,700-117,000 X) =	7,266- 72,660 X
Year 6—	(.564) (11,700-117,000 X) =	6,599- 65,990 X
Year 7—	(.513) (11,700-117,000 X) =	6,002- 60,020 X
Year 8—	(.467) (11,700-117,000 X) =	5,464- 54,640 X
Year 9—	(.424) (11,700-117,000 X) =	4,961- 49,610 X
Year 10—	(.386) (11,700-117,000 X) =	4,516- 45,160 X

¹⁰⁸ See p. 380 *supra* (Corporation B, X).

Year 11—(.350)(11,700-117,000 X) =	4,095-	40,950 X
Year 12—(.319)(11,700-117,000 X) =	3,732-	37,320 X
Year 13—(.290)(11,700-117,000 X) =	3,393-	33,930 X
Year 14—(.263)(11,700-117,000 X) =	3,077-	30,770 X
Year 15—(.239)(11,700-117,000 X) =	2,796-	27,960 X
Total	<u>88,978-889,780 X</u>	

XI. Section 169 Recast as a Reduction in Interest Cost:

$$\begin{array}{r}
 88,978-889,780 X = 83,499 \\
 -889,780 X = -5,479 \\
 \quad X = -5,479 \\
 \quad \quad 889,780 \\
 \quad \quad X = .616\% \\
 10\% - .616\% = 9.384\%
 \end{array}$$